

32 Who Infected Whom?



Epidemiologists (eh-puh-dee-mee-AH-luh-jists) are scientists who trace the spread of a disease through a population. They do this to learn how the disease spreads and to find ways to help prevent its further spread. One way epidemiologists gather such information is by going to a community and comparing sick people with healthy people. Their work is complicated because not all people who are exposed to an infection get sick. Vaccinations, previous exposure to the infection, and overall health affect whether a person who is exposed to an infection will become sick. Sometimes there is no obvious connection among the sick individuals. Epidemiologists then have to resort to testing for the infection in healthy people to find the transmission path. This is because you can pass on an infection before you know you are sick. Some infectious diseases such as typhoid (TIE-foyd) and diphtheria (dip-THEER-ee-uh) can be carried (and spread) for a long time by someone who never develops symptoms of the illness. These **carriers** can be important links in the spread of a disease.

The Abingdon Chronicle

December 15

New Disease at Salk Junior High School?

Yesterday, a science teacher at Salk Junior High School was sent to the hospital with a serious illness. Lab results came back with a surprising diagnosis of a new type of infection. Why the surprise? Because this type of infection has never been observed before in Abingdon.

Ms. Shah became sick on December 3 with a high fever, sore throat, and wheezing cough. At first she thought she had the flu, but when she had difficulty breathing, she went to her doctor. Dr. Holmes of Abingdon Hospital noticed similar symptoms in another patient who is a student at Salk. When interviewed, he commented, “Ms. Shah’s symptoms were very serious. She





was sick for a week and in the hospital for two days. Because Ms. Shah comes into contact with many students each day, I was concerned that this disease might spread. However, there were no more cases for about 10 days. I was so relieved!”

Since then, however, several more people at the school have become sick and have had similar symptoms. Local health officials are concerned. Could this be the beginning of an outbreak? A local epidemiologist, Dr. Montagu, is working to identify the path of transmission: who infected whom? In order to determine this, she has begun to gather information. To date, she has interviewed eight individuals.



Who is (or are) the carrier(s) of the disease?



MATERIALS	
	<p><i>For the class</i></p> <ul style="list-style-type: none"> 2 dropper bottles labeled “Ed” 2 dropper bottles labeled “Heather” 2 dropper bottles labeled “Laura” 2 dropper bottles labeled “Miriam” 2 dropper bottles labeled “Tran” 2 dropper bottles labeled “Mr. Klasky” 2 dropper bottles labeled “Mr. Milligan” 2 dropper bottles labeled “Ms. Shah”
	<p><i>For each group of four students</i></p> <ul style="list-style-type: none"> 1 bottle of Disease Indicator
	<p><i>For each pair of students</i></p> <ul style="list-style-type: none"> 1 set of Interview Cards 1 SEPUP tray
	<p><i>For each student</i></p> <ul style="list-style-type: none"> 1 Student Sheet 32.1, “Lab Tests”

PROCEDURE

Part One: Evidence from Interviews

1. Read the information on the Interview Cards.
2. Discuss with your partner how the disease may have spread from person to person.
3. Move the cards around to develop a web showing who could have caught the disease from whom.
4. In your science notebook, draw what you think is the web of disease transmission. Be sure to include how you think these people are connected. For example:

Ms. Shah (symptoms) $\xrightarrow{\text{science class}}$ Heather (symptoms)
5. Discuss with your partner which people may be carriers of the disease. Record what you think in your science notebook.

6. In order to test your hypothesis, you will be able to test samples of “saliva” from these people for the presence of the disease. Based on your hypothesis, record on Student Sheet 32.1, “Lab Tests,” the names of four people you would most like to test.

Part Two: Collecting Lab Evidence

REMINDER

Good laboratory procedure means no accidental contamination! When using a dropper bottle, unscrew the lid but do not put the lid down on the table. Instead, use the bottle and immediately re-cap it.

7. Find the dropper bottle for one of the people you would like to test. It contains that person’s “saliva.” Place 3 drops of the “saliva” sample into one of the small cups in your SEPUP tray.
8. Test the sample by adding 2 drops of Disease Indicator. Make sure the dropper does not touch the “saliva.” A positive test for the disease will show a pink color.
9. Record your result on Student Sheet 32.1.
10. Repeat Steps 7–9 for the rest of the people you are testing.

ANALYSIS



1. Based on your test results, draw a web showing your proposed path of disease spread. In your web, identify who is infected, the dates that he or she became sick, and whether the person is a carrier. How does this web compare to your original hypothesis?
2. **a.** Who was (or were) the carrier(s) of the disease?
b. What evidence do you have to support your answer?



3. Think back to the suggestions you made to prevent the spread of disease when discussing Analysis Questions 2 and 3 of Activity 30, “It’s Catching!” How does the knowledge that some diseases can be spread by carriers affect your ideas? In other words, what recommendations would you make to a community that was experiencing a disease outbreak?





4. A group of Abingdon parents have demanded that the family members and close friends of all infected individuals, including students and teachers, stay home until everyone with symptoms gets better. Explain whether you agree with their demand. Support your answer with evidence and identify the trade-offs of your decision.

Hint: To write a complete answer, first state your opinion. Provide two or more pieces of evidence that support your opinion. Then consider all sides of the issue and identify the trade-offs of your decision.

5. **Reflection:** Explain whether you would change your answer to Question 4 if the disease had more severe symptoms and a greater chance of causing death.